

Educator- Summary of Lesson Plan 1 Objectives:

- 1) Name two reasons why the Great Salt Lake is so salty**
- 2) Identify the major areas of the GSL**
- 3) State the reason why different parts of the Great Salt Lake have different salinities.**

Introduction

The Great Salt Lake is very unique. There are about 30 salt water lakes in the world and the Great Salt Lake is the largest in the western hemisphere. It has the 9th highest salinity in the world. It is also the 4th largest terminal lake in the world. But what does all this mean? And how did this lake get so salty? A terminal lake means there is no outlet. There are four rivers (Bear, Weber, Ogden, Jordan) flowing into the lake but nothing flows out. This wasn't always the case. Thousands of years ago, the megalake, Lake Bonneville covered most of Utah. It was a fresh water lake with an outlet to the ocean. Around 15,000 years ago, the lake spilled out and drained through the Snake and Columbia Rivers, dropping the lake level by 350ft. The lake continued to drop through evaporation. As it did so, it became saltier and saltier, leaving a "puddle" that is now the Great Salt Lake. Evidence of Lake Bonneville, and its various levels can be seen in prominent shorelines throughout the area. Another reason the lake is so salty is because of our mountains. Utah's mountains have many minerals and salts in them. As rain water and snow melt run down the mountains, minerals and salts are eroded and eventually end up in the Great Salt Lake. Since the lake is a terminal lake, the only way water can leave is through evaporation, leaving the salt and minerals behind. Different parts of the lake are saltier than others. Because of causeways or small man-made dams, sections of the lake are cut off from other parts of the lake. Farmington bay has on average 5% salt, Carrington Bay is about 14% salt, and the North Arm sits around 25 % salt.

Inventory Items in Container

Salt (4)	One Liter bottle (1)
Container of vinegar (1)	Container of regular sand (1)
Pipettes (4)	Magnification glasses (10)
Plastic cups (25)	Volunteer tote bag (1)
Binder with information (1)	Microscope with concave slide (1 each)
Brine shrimp egg container (1)	

How Salty Is It?

Objectives:

- 1) Discuss two reasons why the Great Salt Lake is as salty as it is.
- 2) Identify the three bays of the Great Salt Lake
- 3) State the reason why each of the three bays have different salinity levels

First stop- (Picnic tables by the Island Grille)

PART 1- Salt in the Lake

Welcome to the Great Salt Lake!

Place large map of the GSL onto the picnic table so all students can participate in the following question/answer activities.

Information to provide:

A) the Great Salt Lake is the largest lake west of the Mississippi River and the second saltiest body of water in the world.

B) there are many lakes in Utah that are not salty so why is the Great Salt Lake salty?

- The Great Salt Lake is salty because it is a terminal lake, meaning that it does not have an outlet/outflow- (no rivers flow out of the GSL)

C) where does the salt in the Salt Lake come from in the first place?

- (you can reference water cycle basics at this time-ie. clouds/evaporation and precipitation/snow & rain that make their way into the rivers)
- We have 3 major rivers that flow into the GSL : (Jordan River, Bear River, and Ogden/Weber River) All of these are considered to be freshwater rivers but all have a small amount of salt in them that flow into the GSL. This flow of salt into the GSL has been happening for a very, very long time. Salt does not evaporate so when the water dries up the salt remains.

- These rivers provide a constant supply of freshwater and it is estimated that two million tons of salt flow into the Great Salt Lake every year. Additional water comes from springs, rain and groundwater.
- The GSL does not significantly increase its depth due to direct precipitation. Instead its depth significantly increases due to rivers flowing into the Great Salt Lake from snow melt.

D) what are the three bays of the Great Salt Lake , where are they located, and what is the approximate salinity in each?

- ask students if they think that the salinity (saltiness) of the lake is the same throughout the entire Great Salt Lake- Yes, No, Why?
- Yes, it does have different salinity levels. The rivers are what bring the salts to the GSL but they are also fresh water so you can expect it to be less salty right where the rivers flow in. Another big reason the lake has different salt levels is because of things people have done. (Show causeway and Farmington Bay on the map) Antelope Island blocks the water in Farmington Bay too. So Farmington Bay is kind of separated from the rest of the lake. Bring out the jar that shows the percentage of salt in the ocean so as to have a beginning reference point –3.5% salinity and also the 1 liter empty bottle.
- Before I show you how salty Farmington Bay is we need to have another salty water to compare it to, so we are going to use the ocean. Has anyone been to the ocean? Could you tell the water was salty? How? We'll use this water bottle (smart water bottle with paper wrapped around it). If I went to the ocean and filled this water bottle up with ocean water and let the water evaporate or dry out, there would be this much salt in this much water. It is about 3.5% salinity (show the container marked ocean).
- Ask students if they think that Farmington Bay is saltier than the ocean. Explain that if you were to take the water bottle over to Farmington Bay and fill it with water, dry it out, you would have this much salt in this

much water (1 liter). It is about 5.5% salinity. So it is a little saltier than the ocean but not much. **Take out the jar labeled Farmington Bay and place onto the corresponding bay area on the map. (Each container is labeled with approximate salinity level of each bay)**

- **Another area of Great Salt Lake is Carrington Bay, the bay right across from the picnic area (Show the large “middle” area of the lake on the map). If I collected water out there and filled up the same water bottle and dried the water out, (take out the jar labeled Carrington Bay and place onto the corresponding bay area on the map), I would be left with this much salt in this much water. It is about 14% salinity. So it is a lot more than the ocean and Farmington Bay. Take out the jar labeled North Arm and place onto the corresponding bay area on the map.**
- **There is one more area of GSL. It is called the North Arm, it is way north and west of us. (point out the Promontory mountains and say that the North Arm is on the west side of them - point it out on the map) The North Arm is separated from the rest of the lake by a railroad causeway. It is like the causeway you drove across to get here but this one is for trains. It has a bridge so some water can flow into it from Carrington Bay but there are NO rivers that flow into that area. Do you think it is saltier than even Carrington Bay? If I take this water bottle to the North Arm of GSL and fill it up then let the water dry out, I would have this much salt in this much water, (take out the jar labeled North Arm and place onto the corresponding bay area on the map). It is about 25% salinity. (someone may ask about the Dead Sea, it is 35%)**

END OF PART 1